

CLAIM AMENDMENT

Please amend the claims in accordance with the following listing.

Listing of Claims:

Claims 1-76 (Cancelled).

77. (Currently Amended) A computer-readable memory storing information including instructions, the instructions executable by at least one processor to operate a file system, the instructions, when executed by the at least one processor, causing the at least one processor to perform comprising steps comprising: ~~of:~~

responding to an incoming file server request by copying a descriptor of a file system change to both a first file server and a second file server;

processing said file system change at said first file server while maintaining said descriptor copy at said second file server; and

performing, at said second file server, a file system change in response to a copied descriptor and a service interruption by said first file server.

78. (Currently Amended) A memory as in claim 77, wherein the instructions, when executed by the at least one processor, further cause the at least one processor to perform further

~~include~~ steps of associating a said first file server and a said second file server with a mass storage element.

79. (Currently Amended) A memory as in claim 78, wherein the instructions, when executed by the at least one processor, further cause the at least one processor to perform further ~~include~~ steps of delaying output by at least one said file server to said mass storage ~~system~~ element without delaying a response to file system changes.

80. (Previously Presented) A memory as in claim 78, wherein said mass storage element includes a file storage system and each said file server is disposed for leaving said file storage system in an internally consistent state after processing each said file system change.

81. (Previously Presented) A memory as in claim 78, wherein said steps of performing a file system change in response to a copied descriptor are also operative in response to a service interruption by said second file server.

82. (Currently Amended) A memory as in claim 77, wherein a said first ~~said~~ file server is disposed for processing said file system changes atomically, whereby a said second ~~said~~ file server can on failover process exactly those file system changes not already processed by said first file server.

83. (Currently Amended) A memory as in claim 77, wherein a said first ~~said~~ file server is disposed to respond identically to service interruptions for itself and for a said second ~~said~~ file server.

84. (Currently Amended) A memory as in claim 77, wherein at least one said file server responds to a said file system change before committing a result of said file system change to mass storage.

85. (Currently Amended) A memory as in claim 77, wherein

- each said file server includes a file server change memory;
- each one of said file servers is coupled to at least a portion of said file server change memory included in the other one of said file servers using local memory access; and
- each one of said file servers is coupled to at least a portion of said file server ~~request~~ change memory included in the other one of said file servers using remote memory access.

86. (Previously Presented) A memory as in claim 85, wherein said file server change memory includes a disk block.

87. (Previously Presented) A memory as in claim 85, wherein said file server change memory includes a file server request.

88. (Previously Presented) A memory as in claim 85, wherein said file server change memory is disposed to delay output to a mass storage element without delaying a response to file server requests.

89. (Currently Amended) A memory as in claim 77, wherein said ~~steps~~ step of processing includes steps of processing said file system change at both a primary mass storage element and a mirror mass storage element.

90. (Currently Amended) A computer-readable memory storing information including instructions, the instructions executable by at least one processor to operate a file system, the instructions, when executed by the at least one processor, causing the at least one processor to perform comprising steps comprising: ~~of:~~

receiving a file server request at one of a plurality of file servers and in response thereto copying a descriptor of a file system change into a server change memory;

processing said file system change for both a first set of mass storage devices coupled to a first one of said file servers and for at least one mass storage device in a second set of mass storage devices coupled to a second one of said file servers.

91. (Previously Presented) A memory as in claim 90, wherein said descriptor includes a file server request.

92. (Previously Presented) A memory as in claim 90, wherein said server change memory includes a disk block.

93. (Previously Presented) A memory as in claim 90, wherein said server change memory includes a file server request.

94. (Previously Presented) A memory as in claim 90, wherein said server change memory includes a first portion disposed at said first file server and a second portion disposed at said second file server.

95. (Previously Presented) A memory as in claim 90, wherein said server change memory includes a first portion disposed at said first file server and a second portion disposed at said second file server; and wherein said steps of copying include steps of copying said descriptor into both said first portion and said second portion.

96. (Previously Presented) A memory as in claim 90, wherein said server change memory includes a first portion disposed at said first file server and a second portion disposed at said second file server; and said steps of copying include steps of copying said descriptor into both said first portion and said second portion by either of said first file server or said second file server.

97. (Currently Amended) A memory as in claim 90, wherein said server change memory is disposed to delay output to said at least one mass storage device without delaying a response to file server requests.

98. (Currently Amended) A memory as in claim 90, wherein
 said steps of receiving include receiving a file server request at either said first file server or said second file server, and said steps of copying said descriptor include copying by either said first file server or said second file server; and wherein the instructions, when executed by the at least one processor, further cause the at least one processor to perform step ~~further include steps of~~ processing said file system change for both said second set of mass storage devices and for at least one mass storage device in said first set.

99. (Currently Amended) A computer-readable memory storing information including instructions, the instructions executable by at least one processor to operate a file system, the instructions, when executed by the at least one processor, causing the at least one processor to perform ~~comprising~~ steps comprising ~~of~~:

receiving a file server request at one of a plurality of file servers and in response thereto copying a descriptor of a file system change into a file server change memory; and

responding to a service interruption by performing a file system change in response to a descriptor in said file server change memory.

100. (Currently Amended) A memory as in claim 99, wherein the instructions, when executed by the at least one processor, further cause the at least one processor to perform further ~~include~~ steps of associating said plurality of file servers with at least one mass storage element and at least one file server change memory.

101. (Currently Amended) A memory as in claim 100, wherein the instructions, when executed by the at least one processor, further cause the at least one processor to perform further ~~include~~ steps of leaving a file storage system on said mass storage element in an internally consistent state after processing each said file system change.

102. (Currently Amended) A memory as in claim 100, wherein the instructions, when executed by the at least one processor, further cause the at least one processor to perform further ~~include~~ steps of:

leaving a file storage system on said mass storage element in an internally consistent state after processing file system changes;

associating said internally consistent state with a set of completed file system changes; and

identifying said set of completed file system changes by at least one said file server.

103. (Currently Amended) A memory as in claim 99, wherein the instructions, when executed by the at least one processor, further cause the at least one processor to perform further

~~include~~ steps of delaying output to a mass storage element without delaying a response to file server requests.

104. (Currently Amended) A memory as in claim 99, wherein the instructions, when executed by the at least one processor, further cause the at least one processor to perform further ~~include~~ steps of performing said received file server request at both a primary mass storage element and a mirror mass storage element.

105. (Currently Amended) A memory as in claim 99, wherein the instructions, when executed by the at least one processor, further cause the at least one processor to perform further ~~include~~ steps of:

processing said file system changes atomically at a first said file server; and
on failover processing exactly those file system changes not already processed by
said first file server.

106. (Currently Amended) A memory as in claim 99, wherein the instructions, when executed by the at least one processor, further cause the at least one processor to perform further ~~include~~ steps of responding identically at a first said file server to service interruptions for itself and for a second said file server.

107. (Previously Presented) A memory as in claim 99, wherein said file server change memory includes a disk block.

108. (Previously Presented) A memory as in claim 99, wherein said file server change memory includes a file server request.

109. (Previously Presented) A memory as in claim 99, wherein said file server change memory is disposed to delay output to a mass storage element without delaying a response to file server requests.

110. (Currently Amended) A memory as in claim 99, wherein the instructions, when executed by the at least one processor, further cause the at least one processor to perform further ~~include~~ steps of responding to a file system change before committing a result of said file system change to mass storage at one of said file servers.